A map of the African continent with the country of Zambia highlighted in red. The map shows various countries and their borders, with Zambia's location clearly marked in the southern part of the continent. The text is overlaid on the map.

A Cornell Initiative to Promote Food Security and Rural Livelihoods in Zambia - The Food Processing Component -

**Carmen I. Moraru and Alexander Travis
Cornell University**

Zambia



Lundazi



Lundazi – contd.



The people



The incredible wildlife



Issues in the Luangwa Valley

- Vital for wildlife-based tourism
- 20-60% of households are food insecure
- 42% of food insecure families poach
 - Annual loss of 3000-4000 animals in the Valley alone
- Others plant cotton and tobacco, which leads to:
 - Deforestation
 - Pesticides
 - Poverty cycle
 - HIV
 - Gender inequality

Cotton planted in the protected forest



Burning of trees and forests for charcoal



Food availability

- Vegetables on the local market -



Dried fish



Fruits sold by the roadside



And others...



But for many families...



... this is all they get!

Nshima



... for breakfast, lunch and dinner

Problems affecting conservation and rural development are the same



COMACO



Community Markets for Conservation

The COMACO pilot project

- Development of a market-driven, community-owned approach to improve biodiversity by improving food security and rural livelihoods



Success stories

- Trading guns and snares with farmers -



Success stories

- Launching the “It’s Wild!” brand -



Objectives of the Cornell/WCS project

1. Determine to what extent the COMACO model can be **economically self-sustaining** and evaluate the effectiveness of its components
2. Identify and integrate **new technologies** into COMACO to improve profitability, food security, and rural incomes
3. Determine the extent to which COMACO provides self-sustaining **social** institutions and meaningful roles for the COMACO participants
4. Determine the extent to which the COMACO model improves **biodiversity** and watershed **conservation**

Soil and crop sciences

- Conservation farming techniques
- Tailor for different soils/climates
- Agroforestry

Sociology

- Comparisons (before/after)
- Economic gender equity
- Effect on HIV transmission
- Effect of conservation farming on public health

Biodiversity conservation

- Confirm adoption of conservation practices
- Wildlife censuses
- Handling of crop predation

Strategy

Food science

- Training programs in hygiene and safety
- Integration of new technologies
- Quality improvement and new product development
- Quality and safety testing

Veterinary medicine

- Poultry husbandry & medicine
- Train veterinary paraprofessionals
- Web-based, “virtual” diagnostics
- Economics of veterinary interventions

Food processing at COMACO - Peanut butter processing in 2005 -



Food processing at COMACO

- Peanut butter processing in 2005 -



Food processing at COMACO

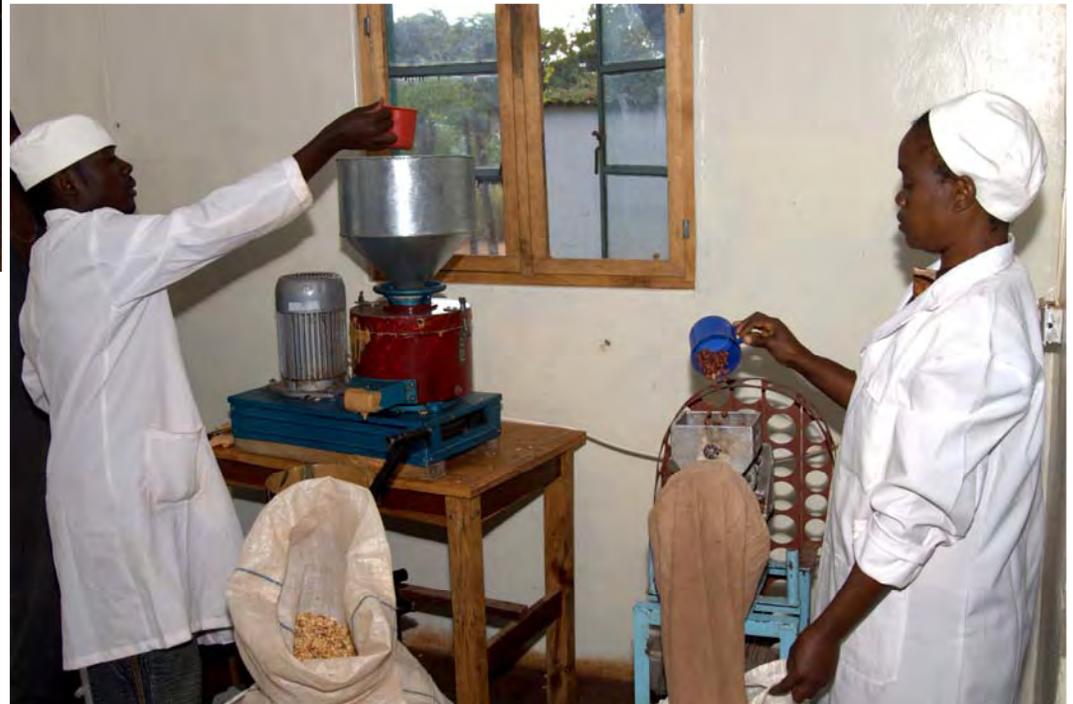
- Peanut butter processing in 2005 -



Peanut butter processing - 2007



- Hygiene practices have improved considerably, but still need improvement
- Other problems: phase separation, leaky jars



Basic food hygiene workshop



- Trainees at the Lundazi COMACO Processing Center



Practicing proper hand washing



- Demonstration of proper hand washing procedure using the Germ Glo kit



Surface cleaning



To complete the picture: dressed for success... and food safety!



COMACO new attire for workers in the food processing facility

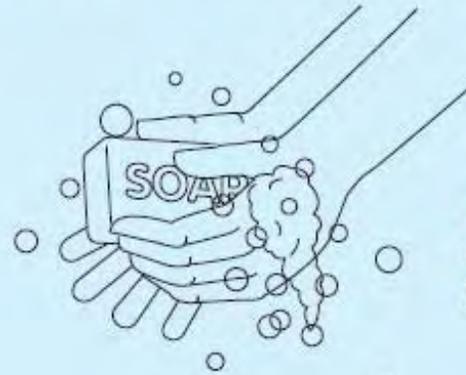


Hand washing posters

Here's how to wash your hands correctly!



1
Wet your hands
with clean water.



2
Add soap and rub to
make lots of bubbles.
Scrub for 20 seconds.



3
Rinse both your hands
really well to flush dirt
and bacteria off your
hands.



4
Dry your hands with
a clean towel or a
paper towel.

Produced by the National GAPs Program at Cornell University (www.gaps.cornell.edu)
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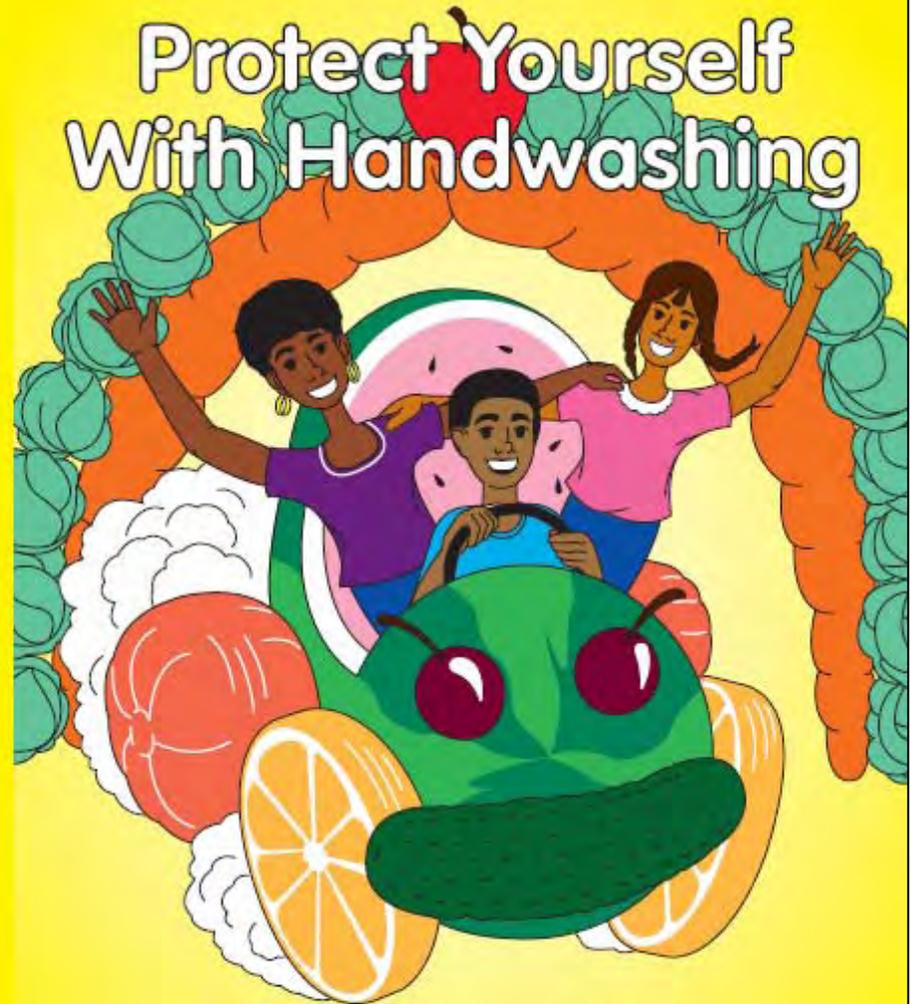
Education starts at an early age

- A coloring book -

Created Especially for the Children of Zambia



Protect Yourself With Handwashing



By Elizabeth A. Bihn, Donna L. Scott, Robert B. Gravani, and Karin Rosberg
Illustrated by Mark Kogut

National Good Agricultural Practices Program in Collaboration with COMACO and SANREM/USAID
Department of Food Science • Cornell University • Ithaca, NY 14853

Impact of training:

- **Everyone is wearing proper clothing -**
-

From workers



To the plant manager



Quality improvement of peanut butter



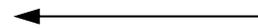
- Degree of peanut crushing diminished in order to minimize oil separation
- Suggestions made to improve the emulsification process
- Some packaging solutions/ suggestions offered
- Qualitative fast tests performed for *Salmonella* and *E. coli* → negative results



Rice processing



De-hulling and
polishing



“Transportation”



Manual grading



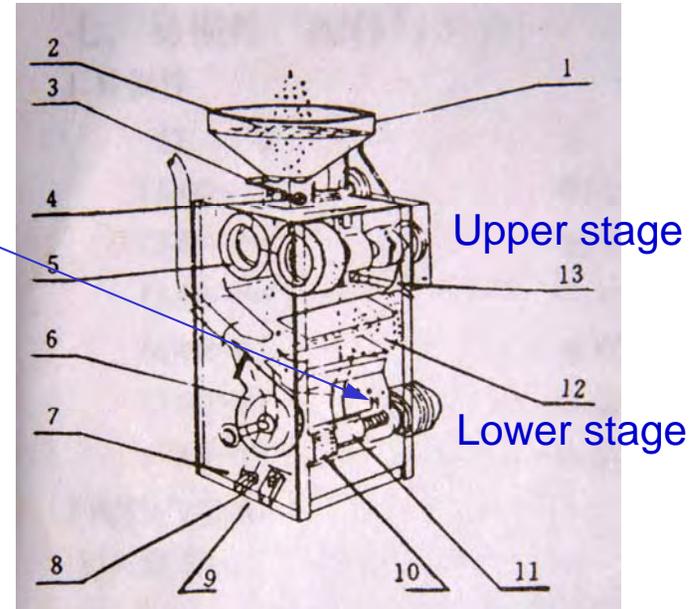
Issues in rice processing

- Large percentage of breakages as a result of polishing
 - Economic losses
 - Need for solutions for the utilization of broken rice, other than converting it into rice flour
- Inefficient husk removal
 - Significant manual grading required
 - Time consuming and costly
- Identified cause: design flaws of the de-hulling and polishing equipment

Solutions offered

1. Improvement of rice milling operations

- Reduction of breakages achieved by increasing the gap between the metal rotor and the metal ridge that caused kernel shearing
- Suggestions made for:
 - Modified use of the equipment
 - A low-cost re-design of the ventilation system of the rice mill



- Preliminary testing gave very promising results

Solutions offered

2. Processing of value added products

- Some snack foods can be made with limited investment
- Products developed from broken rice during the workshop (rice balls, crispy rice chips, rice “candy”)
- Issue: will only use up small amounts of broken rice



Potential long-term solution: Extruded puffed rice snack products

- Economical questions:
 - Is there a market for such products?
 - Will such a significant undertaking pay off?
- Issues related to adding a new product line:
 - Define and formulate the product(s) to be manufactured
 - Packaging, storage, and distribution solutions identified before production starts
 - New operational procedures required if multiple products will be processed with the same extruder
- Technical challenge: current configuration of the extruder does not allow puffing, but this can be addressed

Soy processing

- Soy milk production kicked-off during the workshop



- Flavored versions developed; some could be very successful
- Challenges:
 - Water quality
 - Proper packaging
 - Refrigeration and distribution channels required



Tofu processing and potential uses

- Tofu made out of soy milk during the workshop
- Product liked by a small panel of local people (CTC employees)



- Serving suggestions for incorporation in local diet provided



Another possibility: Soy processing by extrusion

- Extrusion solely used at this point for making HEPS (high energy corn/soy product)
- Meat analogs could be made after retrofitting the extruder with heating capabilities / steam injection; different dies also required



In summary:

- The project is already making an impact on enhancing COMACO's chances for economical self-sustainability
- Food processing: a significant component of the COMACO model, since it can generate value added production and profit
- Needs are numerous, many challenges encountered, particularly due to the poor infrastructure
- Dependence on donor funds still significant
- Strategic alliances required
- Greatest resource: people, so efforts should be channeled on developing and training the human resources. **This is where we can help!**

The Project team

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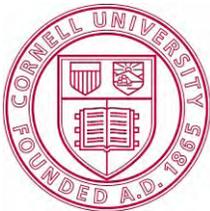
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